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*“Tricks, Traps and Toys” A renaissance in the art of science demonstration August, 2013.* **Simon Taylor**

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| Activity | Notes and explanations |
| 1. **Plasma ball and fluorescent tube (Darth Vader wand demo)- Spooky science demo.** | Purchase a plasma ball (Kmart or warehouse) and a fluorescent tube. Try and make the room as dark as possible. Switch on the ball and then hold the tube close to the ball. The plasma ball has a strong electric field around it and this excites the electrons in the gas in the fluorescent tube generating light from the tube. |
| 1. **Candle in a jar activity (lots of burning and match striking!)** | Collect jars as many as you can- different sizes ( the Pasta jars are good for large size)  Use tea light candles.  Students to light the candle and place jar over lighted candle and time how long the candle takes to go out. Record the time. Make up a table of results. You may want to repeat this. Do this for each jar. You may have five different sized jars. After this measure the volume of each jar by filling with water and pouring it into a measuring jar.  Graph the results “Volume of air versus burn time”, and report back on findings to class |
| **3. Heating and cooling with an upside down round flask** | Clamp up a round bottomed flask or similar on a retort stand with a stopper and tubing, upside down. The glass tube is then lowered into a 250mL beaker with about 50mL water, so water is covering the end of the tube. Pour hot water over the flask and observe bubbles of air, pour cold (iced ) water and observe water being sucked up. ……..Use POE- Predict, Observe and Explain strategy. I love this expt, because it’s using real science equipment and I tend to do it early in the year so the students can get their hands on the real gear. They love to repeat the cooling and heating, over and over. It’s not spectatcular but there is so much science going on… particles, motion, vacuum, pressure, space inside, heating, cooling…. Lots of scientific literacy to unwrap and discuss. |
| **4. Bubbling explosion in a bag** | Take a sandwich sized zip lock plastic bag. Open it and place a measured teaspoon of Baking soda in one corner and a teaspoon of Tartaric or Citric acid in the other. Now place a small canister full of water. eg Old film canisters are perfect size, very carefully inside the bag. Now lock the bag up, once zip locked, let the canister of water fall over in the bag and observe what happens.  The acid and the soda react with the water as a medium for mixing thus making carbon dioxide gas. This reaction is also endothermic, so it gets quite cold! Use POE. This is just a wonderful investigation with so many variables for the kids to explore, and it’s refreshing not to use testubes! What is good too, is that the gas is contained in the bag! |
| **5. Imploding cans** | Set up a trough of iced water, then quickly immerse a heated inverted fizz can. Use tongs. The sudden change in temp, contracts the volume inside the can, imploding it. Safety glasses reqd. You will need a Bunsen burner or a meths burner.  This is a great demo when studying heating and cooling-objects expanding and contracting. |
| **6. Candles reflecting** | Use two identical candles opposite from one another with a section of glass plate between them. Only the front candle is lit but due to reflection the back candle looks like it has a flame too. Initially have the students watch to the front of the set up but then get them to walk around. Ah ha! Discuss reflection and transparency at the glass plate. This is a great starter for a light topic. |
| **7.Balloon on the bottle** | Put a balloon on a large fizz bottle and heat the bottle gently (well above) over a flame. The balloon will inflate due to expansion of air on heating. Then dunk it in ice-balloon will deflate. You can also draw spots on the balloon to show how the distance between air molecules increases with heat. |
| **8. Balloon on the CD** | A Basic hovercraft. Glue a rubber bung with hole onto a CD-Alruldite glue is the best. The balloon gets attached onto the bung and you blow the balloon up. Use on smooth surfaces. |
| **9.Burning teabag** | Simulation of a hot air balloon. Ideas to discuss:Hot air rises….Convection, density. Only teabags (Twinnings with tags) that can be pulled apart will do. Make sure the smoke alarms are off! And get the students to Predict, observe and Explain. Then bring out and compare an hot air paper balloon purchased from Toy shops and heat this up with a hairdryer. |
| **10.Steam boat Billy** | Yes they are making a come back!-can be purchased from toy shops about $15 each. Race them in Gutters, water troughs.  Ideas to discuss: Expansion, contraction, speed…. |
| **11. Cartesian Diver** | An oldie but a goodie! Completely fill a small to medium fizz bottle with water right to the very top then place a small inverted pen top or small test tube (Containing a a little water) into the bottle-(it should not sink), then screw on the top tightly.  Then use your secret teacher power to make the diver fall and rise…. (squeezing the sides of the bottle) |
| **12. Water rocket** | I have had hour and hours of fun with water rockets with kids, from year 4 to year 13!  What you need: Fizz bottles, rubber bung, car valve, bike or foot pumps.  Ideas to discuss and investigate: Action/reaction forces, jets, jet boats, jet skis, rockets, projectiles, Space rockets, space shuttle, speed, gravity and there are many variables for further investigation ie, amount of water, angle of launching. And always get the naughtiest rascal in the class to pump up the rocket! |
| **13.Always wear your seatbelt** | You need a ramp-wooden plank, convertible car, Barbie doll and a brick. Run the car with poor Barbie down the ramp into the brick. Barbie will keep going…. Discuss Newtons first law….Forces,Inertia, objects carry on in motion if not restrained.  Show the Collisions video from *Classroom video and plenty of youtube videos with trains and cars colliding with one another.* |
| **14.Bowling bowls** | Obtain bowling balls (Slightly impaired –sometimes cracked-because they are free) different masses from bowling allies. Use empty milk plastic bottles as skittles.  Great outside and as a competition. Great fun. Heaps of physics to discuss.  Discuss inertia, forces, momentum….. Why does the heavier ball knock down more bottles? |
| **15.Wine glass on a tray** | Circular motion-force seeking the centre (Centipetal force), practice with a plastic glass first! |
| **16.Sparkler on drill** | As above but with a lighted sparkler spinning on a drill. Look at where the sparks are flying, at a tangent to the circle. |
| **17. The Tea Towel trick** | Instead of a tea towel start using a light pillow slip with heavy cutlery and plate. With experience you can pull an entire table laid with dinner but use a very thin table cloth! Key word: Inertia |
| **18. White powders police investigation “Forensic science”–Students work in pairs or teams of three ( No fours or singles!)- Students to take on roles- Technician, director and reporter/researcher.**  **Basic role (3 in a team) identities:**   * **Technician- Responsible for any equipment, that means getting the gear, returning it, washing up and tidying. Using a camera/computer/powerpack/Bunsen/test-tubes etc.** * **Director -The captain (Kahuna) of the team, they take charge, make decisions but with shared discussion with all team members. They get to talk to the class about the findings. They have to know the reasons why you did this…** * **Researcher/scientist- Records and researches any information required. They are responsible for all notes, graphs and measurements.** | Allow a few periods to do this activity. Purchase some white powders: baking soda, caster sugar, baking powder, cornflour, citric acid, Tartaric acid and salt. Place each in containers/jars and label them carefully.  No tasting or eating.  Students investigate each white powder, draw up a table, and record all observations:   * Use test tubes or similar, place each powder in cold water, warm water, hot water, vinegar. * Heat each powder on a tin lid. * Place each in water with a drop of red cabbage indicator or rose water indicator or any flower indicator in a test tube.   Teacher: Now present the unknown suspicious package (ziplock bag containing unidentified white powder!) to the class, in a suitcase from the airport (Use a policeman to visit)- students must identify with investigation what it is! Great fun. |
| **19. Make a torch that can throw light forward ( Reflect) and be operated with one hand only.** | Two C 1.5Volt batteries (middle sized), 3.75 Volt bulb ( Dick Smith or Splustronics), tin foil, some wires and cardboard. This is the best activity for electrical circuits. |
| **20. Design and build a Eco house/ Earthquake proof house/ a bridge/ a spaceship to mars, an emergency shelter…..** | Purchase glue guns- They are essential for any science/technology activities because students can become creative and build things. They are more important than any other piece of science equipment! Only one glue stick per group! Or the other material can be recycled stuff from home. |
| **21. It’s in the bag**  **“In small teams construct something together, talk about what is in your bag, what ideas spring to mind? ideas don’t have to be scientific, they can be from everywhere, anywhere, discuss ideas with your partners, brainstorm, the construction can be imaginary or be a model, you don’t need to use everything in the bag and you can swap things with other teams.**  **Be prepared to discuss what you make, what ideas have you thought about, are there questions you have thought about? Would there be anything from this inquiry that you could further investigate? “Would you tell a story about what you have made, could you share that with the others?”**  **“Finally, from your structure and your ideas, can you write a question from this? This could be a big question, a loaded question, a question that may not have one answer!** | Students working in pairs or threes, check out what is in the inquiry bag. The students are presented with a large zip lock bag with a range of materials in it. They could be shells, paper, glue, some sellotape, a small pair of scissors, cardboard from cereal packet, tin foil, wire, feathers, pencil, some liittle stones, a couple of rubber bands, some matches without the box, string !m etc. Each bag can have different materials. It doesn’t matter.  This task is a wonderful way to help students of any age to start their own inquiry. |
| **22. Ice balls** | Two or three days before your lesson on water and ice, freeze a balloon filled with water , on the day keep it frozen right up to the time you present it, well wrapped in newspaper to the students. Have one per two students. Get them to hold it, while it’s wrapped up and guess what’s inside it. Then students can unwrap it carefully. Check it out, brain storm ideas what you could investigate with this? What questions do the students have? Write them down. You may want to let students do their own investigations. Eg. Floating and sinking, dropping from a height! Rolling. Compare with ice bergs. What is an iceberg? How do icebergs form? What is ice? What is water? Where does water come from? How does water freeze? What happens when water freezes? |
| **23. Ooblek- Cornflour and water and heaps of fun** | Measure out two parts cornstarch and one part water.  Combine the cornstarch and water in an icecream container  Stir until the mixture begins to thicken.  Students can use spoons, funnels strainers, and various other kitchen utensils, and let them explore with the ooblek.  Students can drop a little food coloring onto the ooblek and swirl it around. Observe what happens.  Clean up with soap and water. |